STIC Search Report
EIC 2100

Scientific & Technical Information Center
USPTO

STIC Database Tracking Number: 130376

TO: Fred Ehichoya
Location: 4D49
Art Unit : 2172
Friday, August 20, 2004

Case Serial Number: 09/916388

From: David Holloway
Location: EIC 2100
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Search Notes

Dear Examiner Ehichoya,

Attached please find your search results for above-referenced case.
Please contact me if you have any questions or would like a re-focused search.

David

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STIC EIC 2100 130376

Search Request Form

Today's Date: 8/20/04

What date would you like to use to limit the search?

Priority Date: Other:

Name EHICHIOYA FRED

AU 2172 Examiner # 79719

Room # 4D49 Phone 305-8039

Serial # 09916388

Format for Search Results (Circle One):

PAPER DISK EMAIL

Where have you searched so far?

USP DWPI EPO JPO ACM IBM TDB

IEEE INSPEC SPI Other

Is this a "Fast & Focused" Search Request? (Circle One) YES NO

A "Fast & Focused" Search is completed in 2-3 hours (maximum). The search must be on a very specific topic and meet certain criteria. The criteria are posted in EIC2100 and on the EIC2100 NPL Web Page at http://ptoweb/patents/stic/stic-tc2100.htm.

What is the topic, novelty, motivation, utility, or other specific details defining the desired focus of this search? Please include the concepts, synonyms, keywords, acronyms, definitions, strategies, and anything else that helps to describe the topic. Please attach a copy of the abstract, background, brief summary, pertinent claims and any citations of relevant art you have found.

METHOD, SYSTEM AND STORAGE MEDIUM FOR AUTOMATED INDEPENDENT TECHNICAL REVIEW

Please concentrate on claim 1 and all independent claims especially Technical review, assay results, radioactive waste review template, gamma radiation assay, plutonium isotope

— Please see attached application for possible explanation and claims

STIC Searcher David Holloway Phone 308-7794

Date picked up 8-20-04 Date Completed 8-20-04

sira
Search and Information Resources Administration

DH/ADL
www

Radioactive waste

Radioactive waste is waste material containing radioactive chemical elements which does not have a practical purpose. It is often the product of a nuclear process, such as nuclear fission. Waste can also be generated from the processing of fuel for nuclear reactors or nuclear weapons.

The radioactivity of all nuclear waste decays with time. All radioisotopes contained in the waste have a half-life - the time it takes for any radionuclide to lose half of its radioactivity. Eventually all waste decays into non-radioactive elements.

The faster a radioisotope is decaying, the more radioactive it will be. The factor in deciding how dangerous a pure radioactive substance will be is the energy of the radiation. Some decays yield more energy than others. This is further complicated by the fact that few radioisotopes decay immediately to a stable state, but rather to a radioactive decay product leading to decay chains.

The main objective in managing and disposing of radioactive (or other) waste is to protect people and the environment. This means isolating or diluting the waste so that the rate or concentration of any radionuclides returned to the biosphere is harmless. To achieve this for the more dangerous wastes, the preferred technology to date has been deep and secure burial. Transmutation, long-term retrievable storage, and removal to space have also been suggested.

Types of radioactive waste

Low level Waste (LLW) is generated from hospitals and industry, as well as the nuclear fuel cycle. It comprises paper, rags, tools, clothing, filters etc which contain small amounts of mostly short-lived radioactivity. It does not require shielding during handling and transport and is suitable for shallow land burial. To reduce its volume, it is often compacted or incinerated before disposal.

Intermediate level Waste (ILW) contains higher amounts of radioactivity and some requires

shielding. It typically comprises resins, chemical sludges and metal fuel cladding, as well as contaminated materials from reactor decommissioning. It may be solidified in concrete or bitumen for disposal. Generally short lived waste (mainly from reactors) is buried in a shallow repository, while long lived waste (from fuel reprocessing) will be disposed of deep underground.

High level Waste (HLW) arises from the use of uranium fuel in a nuclear reactor and nuclear weapons processing. It contains the fission products and transuranic elements generated in the reactor core. It is highly radioactive and hot. It can be considered the "ash" from "burning" uranium. HLW accounts for over 95% of the total radioactivity produced in the process of nuclear electricity generation.

Wastes from nuclear reactor fuel processing

Uranium oxide concentrate from mining is not significantly radioactive - barely more so than the granite used in buildings. It is refined to form yellowcake (U3O8), then converted to uranium hexafluoride gas (UF6). As a gas, it undergoes enrichment to increase the U-235 content from 0.7% to about 3.5%. It is then turned into a hard ceramic oxide (UO2) for assembly as reactor fuel elements.

The main by-product of enrichment is depleted uranium, principally the U-238 isotope, which is stored, either as UF6 or as U3O8. Some is used in applications where its extremely high density makes it valuable, such as the keels of yachts, and artillery shells. It is also used (with recycled plutonium) for making mixed oxide fuel and to dilute highly enriched uranium from weapons stockpiles which is now being redirected to become reactor fuel.

Disposing of high-level wastes

High-level radioactive waste is stored temporarily in spent fuel pools and in dry cask storage facilities.

In 1997, in the 20 countries which account for most of the world's nuclear power generation, spent fuel storage capacity at the reactors was 148,000 tonnes, with 59% of this utilised. Away-from-reactor storage capacity was 78,000 tonnes, with 44% utilised. Annual arisings are about 12,000 tonnes. Final disposal is therefore not urgent.

France is furthest ahead with preparation for HLW disposal. In 1989 and 1992 it commissioned commercial plants to vitrify HLW left over from reprocessing oxide fuel, although there are adequate facilities elsewhere, notably in the UK and Belgium. The capacity of these western European plants is 2,500 canisters (1000 t) a year, and some have been operating for 18 years.

The Australian Synroc (synthetic rock) is a more sophisticated way to immobilize such waste, and this process may eventually come into commercial use for civil wastes (it is curently being developed for US military wastes).

The process of selecting appropriate deep final repositories is now under way in several countries with the first expected to be commissioned some time after 2010. Sweden is well advanced with plans for direct disposal of spent fuel, since its Parliament decided that this is acceptably safe, using the KBS-3 technology. In Germany, there is a political discussion about the search for an *endlager* (final repository) for radioactive waste, accompanied by loud protests especially in the Gorleben village in the Wendland area, which was seen ideal for the final repository until 1990 because its location next to the border to the former GDR. Actually this place is used to store radioactive waste non-permanently. The US has opted for a final repository at Yucca Mountain in Nevada. There is also a proposal for an international HLW repository in optimum geology - Australia or Russia are possible locations -

however, when the proposal for a global repository for Australia has been raised domestic political objections have been loud and sustained, making such a dump in Australia unlikely.

References

- The US Nuclear Regulatory Agency has an informative website: http://www.nrc.gov/waste.html

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